

APPARATUS AND METHOD FOR SEARCHING INTERSECTION

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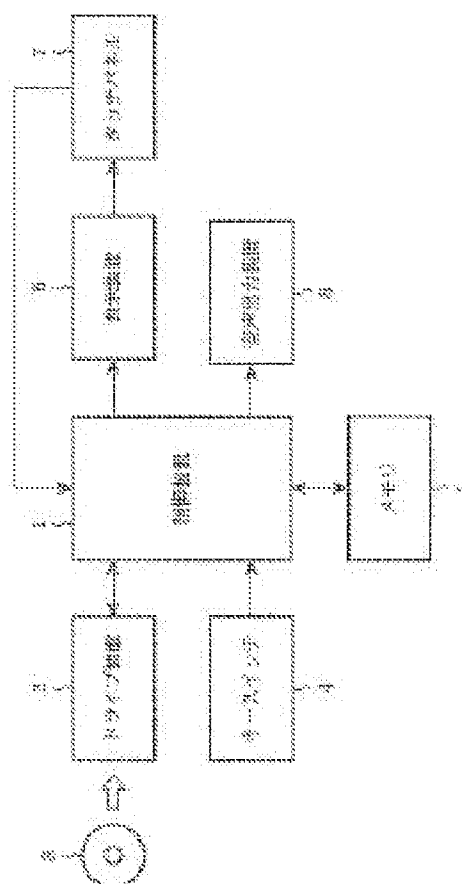
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Abstract of JP 2003172624 (A)

PROBLEM TO BE SOLVED: To easily search a target intersection even if setting cannot be made since the names of a road and an intersection that cross a road to be searched are unknown. ;

SOLUTION: There are a map information acquisition means 12 for acquiring map information, an input means 13 for specifying intersection-related information on a road to be searched from a road included in the map information, facilities, and characteristic objects, an intersection searching means 11 for searching an intersection that exists on the road to be searched being specified by the input means 13 and at the same time is placed adjacent to the facilities and characteristic objects of the specified intersection-related information, and an output means 14 for outputting intersection information on the intersection that is searched by the intersection searching means 11. ;

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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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FULL CONTENTS

[Claim(s)]

[Claim 1] A crossing retrieval device comprising:

A map information acquisition means which acquires map information.

An input means which specifies a retrieval object road and crossing pertinent information about an institution or the feature thing from a road included in said map information.

A crossing search means to search a crossing where an institution and the feature thing of said said specified crossing pertinent information adjoin from said map information while existing on said retrieval object road specified by said input means.

An output means which outputs crossing information about said crossing searched by said crossing search means.

[Claim 2] Specify an input means and two or more institutions and combination of the feature thing, [a crossing search means] The crossing retrieval device according to claim 1 searching a crossing where said institution as which said combination was specified by said input means, and the feature thing adjoin from map information while existing on a retrieval object road specified by said input means.

[Claim 3] The crossing retrieval device according to claim 1 searching a crossing which an institution specified by an input means and the feature thing adjoin within prescribed distance from map information while a crossing search means exists on a retrieval object road.

[Claim 4] A number of a road where crossing information intersects an intersectional kind, a name, a position, and a crossing, An institution which adjoins a kind, a name, a direction, *****, the number of lanes, and a crossing, or the number of the feature thing, A crossing retrieval device given [of Claim 1 including travel a kind, a name, a position, distance from a crossing, traffic restriction information in a crossing, distance in a straight line from a predetermined point to a crossing, course distance or time, or one of combination to Claim 3] in any 1 paragraph.

[Claim 5] A crossing retrieval device given [of Claim 1, wherein an output means outputs crossing information visually or auditorily with a form which can be recognized to Claim 4] in any 1 paragraph.

[Claim 6] A crossing retrieval device given [of Claim 1 indicating the crossing information on a crossing single / an output means / or multiple by list to Claim 5] in any 1 paragraph.

[Claim 7]The crossing retrieval device according to claim 6 when crossing information is outputted for every attribute of the, wherein an output means gives a priority to each of that crossing information and indicates by list.

[Claim 8]The crossing retrieval device according to claim 7 which an output means is distance or the order of travel time from a crossing or the order of an initial of a name of a cross street, the order of cross street width, and a predetermined point to a crossing, and is characterized by indicating the crossing information by list.

[Claim 9]A crossing retrieval device of Claim 6, wherein an output means outputs crossing information chosen from crossing information by which it was indicated by the list to Claim 8 given in any 1 paragraph.

[Claim 10]The crossing retrieval device according to claim 9 characterized by indicating said crossing and said institution, or the feature thing by emphasis on a map by discoloration or modification of a mark, or a blink display which shows a specified institution or the feature thing which adjoins a crossing and this as which an output means was chosen.

[Claim 11]A crossing search method comprising:

A map information acquisition process in which map information is acquired.

From a road to a retrieval object road included in said map information.

An input process in which crossing pertinent information about an institution or the feature thing is specified.

A crossing search process in which a crossing where an institution and the feature thing of said said specified crossing pertinent information adjoin is searched from said map information while existing on said retrieval object road specified in said input process, and an output process in which crossing information about said crossing searched with said crossing search process is outputted.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the crossing retrieval device and crossing search method which made intersectional search easy.

[0002]

[Description of the Prior Art]For example, in the navigation device which performs routing assistance to the destination of a mobile, there is crossing search as one of the methods which searches the destination. In this conventional crossing search, the road name which crosses to the retrieval object road specified by a user is displayed in a list. And said user chooses the road name which intersects said retrieval object road at a crossing to search from said road name displayed in a list, and pinpoints said crossing to search.

[0003]

[Problem to be solved by the invention]Specific [of the crossing to search since search of the conventional crossing was performed as mentioned above, if the road name which intersects a

retrieval object road cannot be set up] could not be carried out, but if the road name which intersects said retrieval object road was not known, the technical problem that intersectional search made into the purpose could not be performed occurred.

[0004]It is made in order that this invention may solve the above technical problems, and it aims at acquiring the crossing retrieval device and crossing search method which made intersectional search easy.

[0005]

[Means for solving problem]The map information acquisition means from which the crossing retrieval device concerning this invention acquires map information, While existing on the retrieval object road specified by the input means which specifies a retrieval object road and the crossing pertinent information about an institution or the feature thing from the road included in map information, and the input means, It has a crossing search means to search the crossing where the institution and the feature thing of the specified crossing pertinent information adjoin from map information, and an output means which outputs the crossing information about the crossing searched by the crossing search means.

[0006]An input means specifies the crossing retrieval device concerning this invention, and two or more institutions and the combination of the feature thing, [a crossing search means] While existing on the retrieval object road specified by the input means, the crossing where the institution as which combination was specified by the input means, and the feature thing adjoin is searched from map information.

[0007]The institution and the feature thing which were specified by the input means adjoin within prescribed distance, and the crossing retrieval device concerning this invention is provided with a crossing search means to search the crossing which exists on a retrieval object road from map information.

[0008]Crossing information the crossing retrieval device concerning this invention An intersectional kind, a name, The number of the road which intersects a position and a crossing, a kind, a name, a direction, *****, the number of lanes, It is made to include travel the number of the institution which adjoins a crossing, or the feature thing, a kind, a name, a position, the distance from a crossing, the traffic restriction information in a crossing, the distance in a straight line from a predetermined point to a crossing, course distance or time, or one of combination.

[0009]It is made, as for the crossing retrieval device concerning this invention, for an output means to output crossing information visually or auditorily with the form which can be recognized.

[0010]The crossing retrieval device concerning this invention is made to indicate the crossing information on a crossing single [an output means] or multiple by list.

[0011]When crossing information is outputted for every attribute of that, an output means gives a priority to each of that crossing information, and is made to give a list indication of the crossing retrieval device concerning this invention.

[0012]An output means is the distance or the order of travel time from a crossing or the order of an initial of the name of a cross street, the order of cross street width, and a predetermined point to a crossing, and the crossing retrieval device concerning this invention is made to indicate the crossing information by list.

[0013]It is made for the crossing retrieval device concerning this invention to output the crossing information as which the output means was chosen from the crossing information by which it was indicated by the list.

[0014]The crossing retrieval device concerning this invention is made to indicate a crossing and an institution, or the feature thing on a map by the discoloration or modification of a mark, or the blink display which shows the specified institution or the feature thing in which an output means adjoins the selected crossing and this by emphasis.

[0015]A road to the map information acquisition process in which the crossing search method concerning this invention acquires map information, and the retrieval object road included in map information, While existing on the retrieval object road specified in the input process in which the crossing pertinent information about an institution or the feature thing is specified, and the input process, It has a crossing search process in which the crossing where the institution and the feature thing of the specified crossing pertinent information adjoin is searched from map information, and an output process in which the crossing information about the crossing searched with the crossing search process is outputted.

[0016]

[Mode for carrying out the invention]Embodiment 1. drawing 1 is a block diagram showing the composition of the crossing retrieval device which realizes the crossing search method of this embodiment of the invention 1. The following explanation explains the case where this crossing retrieval device is used for the navigation device for mount to an example. In a figure, the control device which 1 is constituted by the computer and controls each part, and 2 are the drive devices for reading the map information stored in the storage 3. CD-ROM is used as the storage 3. 4 is a key switch and is provided with the operation switch for performing various setup for performing the routing assistance and crossing search which include specification of the crossing pertinent information about a retrieval object road, and an institution and the feature thing from the road included in the ignition key switch of a car, and said map information, etc. When 5 performs said map information read from the storage 3, and crossing search, the memory which stores the various data for displaying various required operation screens, and 6 are the display devices for example, by a liquid-crystal-display method. 7 is a touch panel device and is arranged on the display screen of said display device 6. 8 is a speech output unit for announcing on the occasion of crossing search or routing assistance.

[0017]Drawing 2 is a functional block diagram blocking and showing the control device 1 which realizes the function of this crossing retrieval device for every function. A crossing search means by which 11 searches a crossing with the crossing search method of this embodiment of the invention 1 in a figure, The map information acquisition means to which 12 reads map information from the storage 3 via the drive device 2, The input-and-output interface of the touch panel device 7 for 13 to take in the signal according to the position which carried out touch operation, and a road to the retrieval object road which are included in said map information, It is an input means containing the I/O port for taking in the ON/OFF signal of the key switch 4 for performing an institution, specification of the crossing pertinent information about the feature thing, etc. The interface for a display for outputting the various data which 14 is an output means and displays various operation screens

required when performing crossing search to the display device 6, The interface for voice response for outputting audio signals, such as an announcement for said crossing search or routing assistance, to the speech output unit 8, etc. are included. 15 is a memory control means which reads said various data from the memory 5 if needed in storing in the memory 5 various data, such as map information read from the storage 3, ****.

[0018]Next, operation is explained. Drawing 3 is a flow chart which shows operation of the control device 1 in this crossing retrieval device. In this crossing retrieval device, selection of the road which is the target of search by a user first is performed (step ST1). In this case, the road A should be chosen as a retrieval object road, for example. As a result, the control device 1 outputs the genre selection screen shown in drawing 4 (step ST2). The institution which the data for displaying this genre selection screen is stored in the memory 5, and contains a "bank", a "convenience store", a "hotel", a "hospital", a "dealer", etc. in a genre, The feature thing including "those with a signal", "with no signal", a "footbridge", a "monument", a "three-forked road", etc. is contained. These institutions and the feature thing are the institution which adjoined the crossing, the feature thing, or the institution and the feature thing which adjoined within prescribed distance from the crossing. A user chooses a desired genre via the touch panel device 7 to said genre selection screen. The crossing search means 11 of the control device 1 judges a genre with said selected user (step ST3), [according to a genre with the selected user] If the institution "bank" was chosen, the institution selection screen where "all the facility name selection button" 31 for choosing about "facility name selection button" 32 and all the bank names for choosing a concrete bank name as shown in drawing 5 were outputted will be displayed (step ST5). The data displayed on this institution selection screen is stored in the memory 5 for every facilities, such as a "bank", a "convenience store", a "hotel", a "hospital", and a "dealer." If a user operates "facility name selection button" 32 to this institution selection screen, the institution of that selected bank name will serve as a retrieval object, and if a user operates "all the facility name selection button" 31, the institution of all the bank names will serve as a retrieval object.

[0019]An institution or the feature thing which drawing 6 is a search label screen and was chosen by user by the road A selected by said step ST1, said step ST3, or step ST5 is displayed (step ST4). An example of a search label screen shown in drawing 6 shows a case where an institution "bank" was chosen by user to a genre selection screen in step ST3, and also "all the facility name selection button" 31 are operated to an institution selection screen in step ST5. A button in case "condition addition button" 43 in a search label screen of drawing 6 specify two or more institutions or feature things, and "search button" 44 are the buttons for searching an institution or the feature thing made into the purpose.

[0020]In a search label screen shown in drawing 6, a user's operation of "condition addition button" 43 will display a condition selection screen shown in drawing 7 (step ST7). (step ST6) This condition selection screen is a screen which chooses OR conditions or AND conditions, when a user specifies two or more institutions or feature things by "condition addition button" 43, and the display output of "OR condition button" 51 and "AND condition button" 52 is carried out. A user operates "OR condition button" 51 or "AND condition button" 52 to this condition selection screen. In this case, supposing "AND condition button" 52 are chosen by user, processing of step ST2, step ST3, step ST5 (only

when step ST5 chooses an institution in step ST3), and step ST4 will be repeated again. A user presupposes that for example, the feature thing "footbridge" was chosen by step ST3 to a genre selection screen displayed in step ST2 in this repetition processing. As a result, feature thing "footbridge" 63 which a user chose as a search label screen of drawing 6 by step ST3 of said repetition processing, A screen to which AND conditions which a user chose by "AND condition button" 52 in said step ST6 were added as shown in drawing 8 is displayed (changing and carrying out step ST4). Since the display output of the "condition addition button" 65 [same] and "search button" 66 as a search label screen shown in said drawing 6 is carried out in a screen shown in this drawing 8, When a user adds an institution or the feature thing further, A "condition addition button" Processing which progresses to processing which operates 65 and progresses to step ST7, step ST2, step ST3, and step ST4 or step ST7, step ST2, step ST3, step ST5, and step ST4 is repeated. [0021]Next, if a user operates "search button" 66 by which the display output was carried out on a screen shown in drawing 8 (step ST6), From a crossing of the retrieval object road A, about all the institutions "bank" which a user chose to an institution selection screen in said step ST5, the bank name, The feature thing "footbridge" which said user chose to a genre selection screen by said repetition step ST3 adjoins, A list display screen which searches a crossing corresponding to AND conditions (the bank name and feature thing "footbridge" both exist about an institution "bank") selected by "AND condition button" 52 of a genre selection screen of said step ST7, and is shown in drawing 9 is outputted (step ST8). Out of crossing pertinent information beforehand set up for every crossing, a thing corresponding to said AND conditions is searched, and this crossing information displayed in a list is outputted. The attribute of a road name in which a crossing exists, for example, a crossing name, an adjoining facility name, the feature thing, etc. is made into a group for every crossing, and crossing pertinent information beforehand set up for every crossing of this is beforehand saved as map information in the storage 3 or the memory 5.

[0022][based on the current position data of the self-car given in this list display screen from the position detecting means which is not illustrating a navigation device] Sequentially from the crossing whose distance in a straight line from the current position of a self-vehicle is the shortest, the bank name is displayed in a list about all the institutions "bank" which the user chose in "distance", a "crossing name", and said step ST5. In this list display screen, the display output of "road name button" 72, "order button of the width of road" 73, "order-of-the-Japanese-syllabary button" 74, and "map button" 75 besides said list display is carried out.

[0023]If a user operates "road name button" 72 to this list display screen, it will replace with said crossing name currently displayed in a list, and the crossing information which is each road name which crosses at said retrieval object road A and said each crossing will be displayed. When a user operates "order button of the width of road" 73, it is order with large width of said retrieval object road A and the crossing road, and also crossing information, including a crossing name or a road name, is displayed in the order of the Japanese syllabary by operating "order-of-the-Japanese-syllabary button" 74.

[0024]Next, if one crossing which a user shows with the numerals 71 is chosen from the list display of said list display screen and also "map button" 75 are operated, The crossing information on said crossing which includes crossing pertinent information which adjoined said crossing, such as an

institution and the feature thing, with a map screen as shows the crossing which said user chose to drawing 10 arranged at the center of a screen is displayed. In this case, it is also possible to perform scale change and scrolling of said map screen by a user's selection operation. Said crossing information is outputted visually or auditorily by the display device 6 or the speech output unit 8 with the form which can be recognized. It is also possible to display the specified institution or the feature thing which adjoins said selected crossing and this by discoloration, modification, or blink of the symbol, and to indicate said crossing and said institution, or the feature thing by emphasis on a map. It is also possible to set up said selected crossing for any of the origin at the time of a navigation device performing routing assistance, the destination, a course place, and a registration place being. [0025]The number of the road which intersects an intersectional kind, a position, and a crossing as said crossing information, It may constitute so that the traffic restriction information in the number of an institution or the feature thing, the name, the position, the distance from a crossing, and the crossing contiguous to road kinds, such as a national highway and a prefectural road, a direction, the number of lanes, and a crossing, the distance in a straight line from a predetermined point to a crossing, course distance, travel time, etc. may be outputted. When constituted in this way, it is also possible to give a priority to the list display screen of said step ST8 for every attribute of crossing information, and to display a crossing in a list on it like the distance from a predetermined point to a crossing or the order of travel time.

[0026]As mentioned above, if only the main institutions and the feature thing near a crossing which are made into the purpose are got to know and it is [it is clear and] even if a user knows neither a road name crossing to a retrieval object road, nor a crossing name according to this Embodiment 1, it is effective in the ability of a user to search the target crossing easily. Although the navigation device for mount was made into the example and explained by the above-mentioned Embodiment 1, this invention is applicable also like the cellular phone which has the Navi function.

[0027]

[Effect of the Invention]As mentioned above, the map information acquisition means which acquires map information according to this invention, While existing on the retrieval object road specified by the input means which specifies a retrieval object road and the crossing pertinent information about an institution or the feature thing from the road included in map information, and the input means, Since it constituted so that it might have a crossing search means to search the crossing where the institution and the feature thing of the specified crossing pertinent information adjoin from map information, and an output means which outputs the crossing information about the crossing searched by the crossing search means, Even if a road name and a crossing name crossing to a retrieval object road are unknown and it cannot set up, it is effective in the ability to search the target crossing easily.

[0028]According to this invention, an input means specifies two or more institutions and the combination of the feature thing, and them, [a crossing search means] Since it constituted so that the crossing where the institution as which combination was specified by the input means, and the feature thing adjoin might be searched from map information while existing on the retrieval object road specified by the input means, Even if a road name and a crossing name crossing to a retrieval object road are unknown and it cannot set up, it is effective in the ability to search the target crossing

with specifying two or more institutions and the combination of the feature thing easily.

[0029]Since according to this invention it constituted so that it might have a crossing search means to search the crossing which the institution and the feature thing which were specified by the input means adjoin within prescribed distance, and exists on a retrieval object road from map information, Even if a road name and a crossing name crossing to a retrieval object road are unknown and it cannot set up, it is effective in eliminating an unnecessary crossing and being able to search only the target crossing easily.

[0030]The number of the road where crossing information intersects an intersectional kind, a name, a position, and a crossing according to this invention, The institution which adjoins a kind, a name, a direction, *****, the number of lanes, and a crossing, or the number of the feature thing, Since it constituted so that travel a kind, a name, a position, the distance from a crossing, the traffic restriction information in a crossing, the distance in a straight line from a predetermined point to a crossing, course distance or time, or one of combination might be included, it is effective in the ability to search the target crossing easily using detailed crossing information.

[0031]According to this invention, since the output means constituted so that crossing information might be outputted visually or auditorily with the form which can be recognized, it is effective in the ability to search the target crossing easily, without being influenced by the external noise.

[0032]According to this invention, since the output means constituted so that the crossing information on a single or multiple crossing might be indicated by list, the crossing used as a retrieval object can be outputted intelligibly, and it is effective in the ability to search the target crossing easily.

[0033]According to this invention, when an output means outputs crossing information for every attribute of that, a priority is given to each of that crossing information, and since it constituted so that it might indicate by list, the crossing used as a retrieval object can be outputted more intelligibly, and it is effective in the ability to search the target crossing easily.

[0034]According to this invention, an output means, [in order of the distance from a crossing or the order of an initial of the name of a cross street, the order of cross street width and a predetermined point to a crossing, or travel time] Since it constituted so that the crossing information might be indicated by list, the crossing used as a retrieval object can be outputted in order of the distance from the order of an initial of the name, the order of cross street width, and a predetermined point to a crossing, or travel time, and it is effective in the ability to search the target crossing easily.

[0035]According to this invention, since the output means constituted so that the crossing information chosen from the crossing information by which it was indicated by the list might be outputted, it is effective in intersectional pinpointing made into the purpose becoming easy on a map screen.

[0036]According to this invention, with the discoloration or modification of a mark, or the blink display which shows the specified institution or the feature thing which adjoins the selected crossing and this, [an output means] Since it constituted so that a crossing and an institution, or the feature thing might be indicated by emphasis on a map, it is effective in intersectional pinpointing made into the purpose by discoloration or modification of a mark, or blink display on a map screen becoming easy.

[0037]A road to the map information acquisition process in which map information is acquired according to this invention, and the retrieval object road included in map information, While existing on the retrieval object road specified in the input process in which the crossing pertinent information

about an institution or the feature thing is specified, and the input process, Since it constituted so that it might have a crossing search process in which the crossing where the institution and the feature thing of the specified crossing pertinent information adjoin is searched from map information, and an output process in which the crossing information about the crossing searched with the crossing search process is outputted, Even if a road name and a crossing name crossing to a retrieval object road are unknown and it cannot set up, it is effective in the ability to search the target crossing easily.

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the composition of the crossing retrieval device which realizes the crossing search method of this embodiment of the invention 1.

[Drawing 2] It is a functional block diagram blocking and showing the control device which realizes the function of the crossing retrieval device of this embodiment of the invention 1 for every function.

[Drawing 3] It is a flow chart which shows operation of the control device in the crossing retrieval device of this embodiment of the invention 1.

[Drawing 4] It is a screen figure showing the genre selection screen in the crossing retrieval device of this embodiment of the invention 1.

[Drawing 5] It is a screen figure showing the institution selection screen in the crossing retrieval device of this embodiment of the invention 1.

[Drawing 6] It is a screen figure showing the search label screen in the crossing retrieval device of this embodiment of the invention 1.

[Drawing 7] It is a screen figure showing the condition selection screen in the crossing retrieval device of this embodiment of the invention 1.

[Drawing 8] It is a screen figure showing the feature thing which the user chose in the crossing retrieval device of this embodiment of the invention 1, and the search label screen to which AND conditions were added.

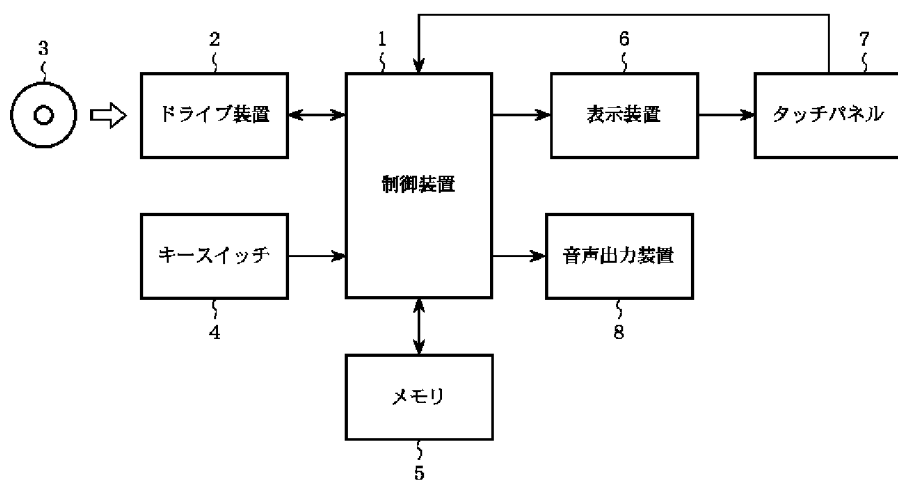
[Drawing 9] It is a screen figure showing the list display screen in the crossing retrieval device of this embodiment of the invention 1 of this embodiment of the invention 1.

[Drawing 10] It is a screen figure showing the map screen which has arranged the crossing which the user chose in the crossing retrieval device of this embodiment of the invention 1 at the center of a screen.

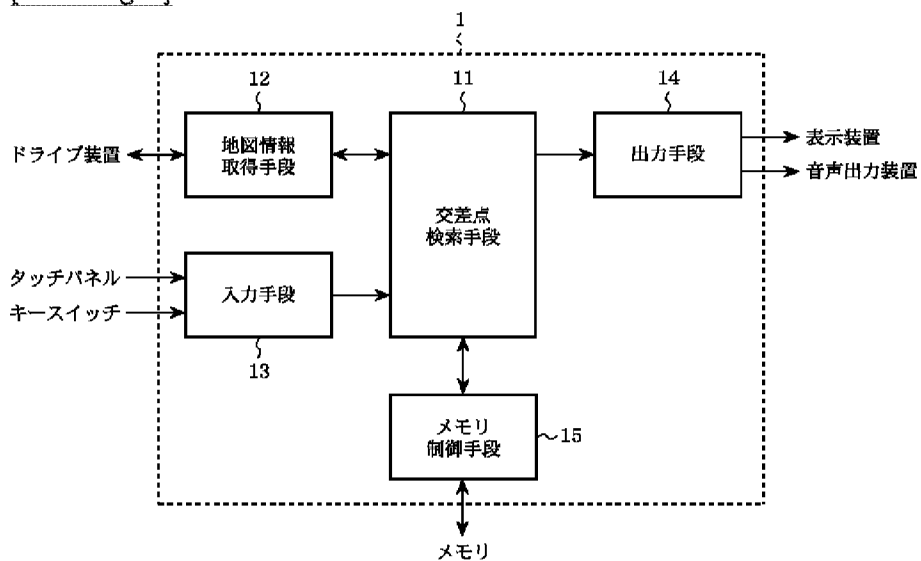
[Explanations of letters or numerals]

1 A control device, 2 drive devices, and 4 [A map information acquisition means, 13 input means, and 14 / An output means.] A key switch, 7 touch panel devices, and 8 A speech output unit and 11 A crossing search means and 12

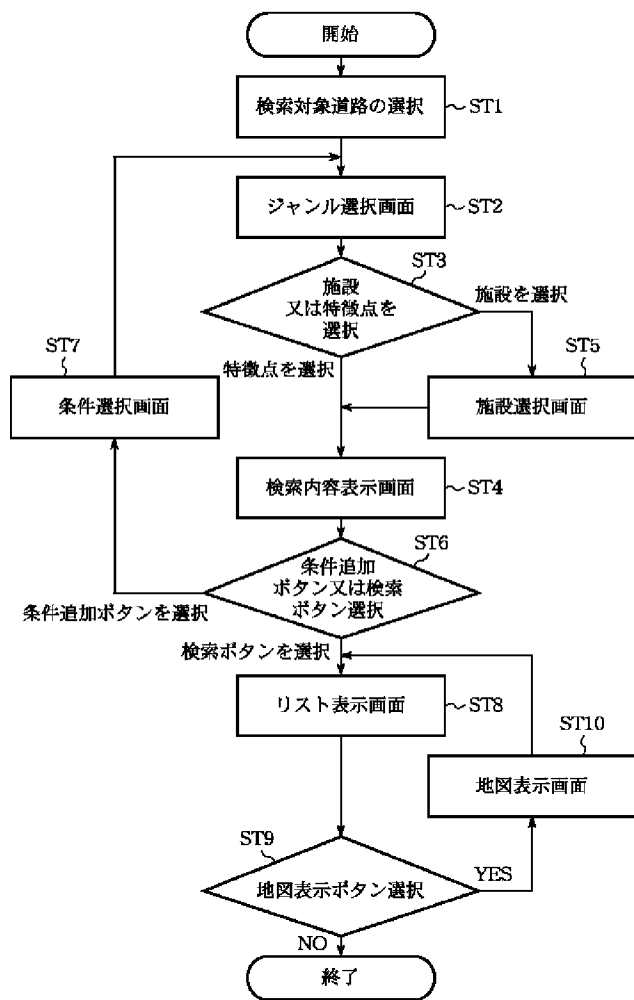
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Drawing 4]

ジャンル選択画面

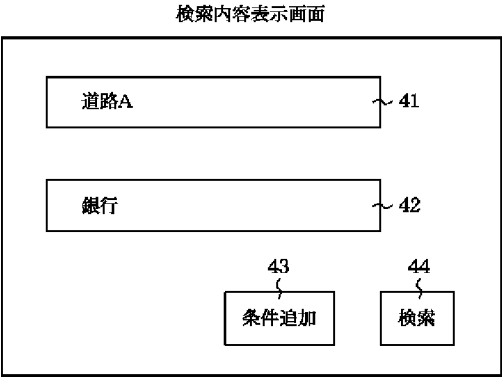
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病院	モニュメント
ディーラー	三叉路

[Drawing 5]

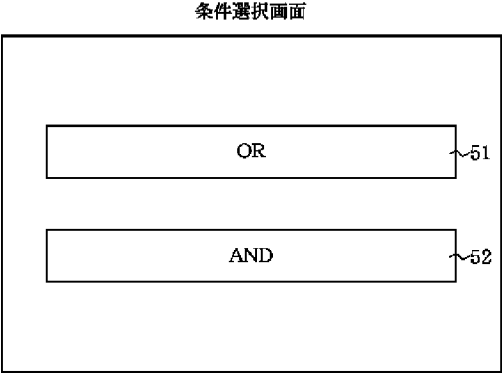
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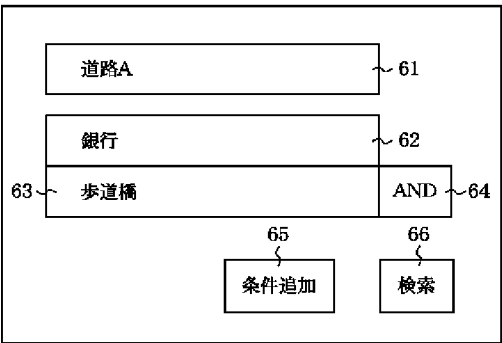
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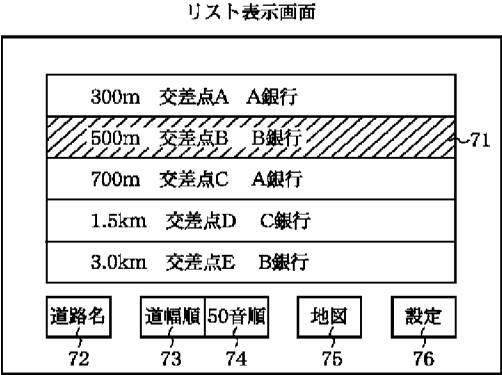
[Drawing 7]



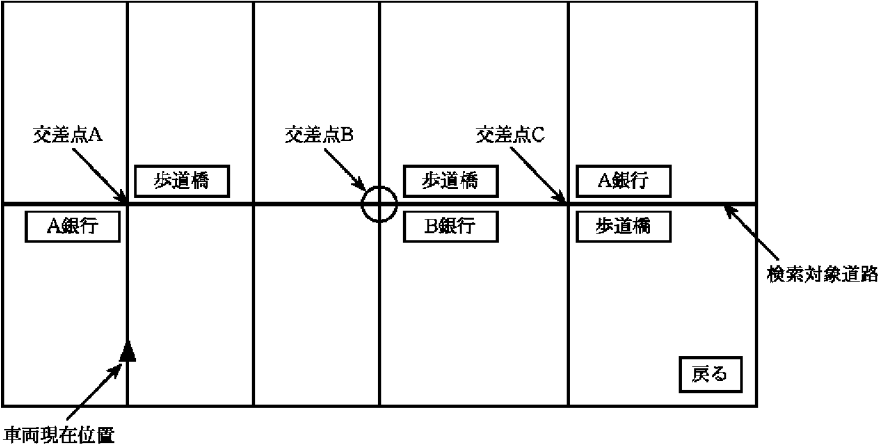
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]